Supplementary material

Modulation of smoking cue reactivity by social context – Implications for exposure therapy in virtual reality

**Table S1** Mean (SD) scores of smokers on the scales of the Smoking Motives Questionnaire (SMQ).

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| --- | --- | --- |
|  | Smokers  (*n* = 32) | |
| *M* | *SD* |
|  |  |  |
| Stimulation | 1.01 | 0.69 |
| Indulgent | 1.58 | 0.58 |
| Psychosocial | 0.81 | 0.52 |
| Sensorimotor | 1.21 | 0.64 |
| Addictive | 1.43 | 0.70 |
| Automatic | 0.66 | 0.67 |
| Sedative | 2.05 | 0.97 |

**Changes in self-reported desire to smoke, pleasure, arousal, desire to eat, desire to drink water and desire to drink alcohol during the study (see Supplementary Table S2**)

Results similar to the analysis of the QSU-G data were found for the analysis of self-reported desire to smoke, which returned significant effects of group, *F*(1,63) = 135.53, *p* < .001, ηp2 = .68, time, *F*(2,126) = 46.81, *p* < .001, ηp2 = .43, and group x time, *F*(2,126) = 38.36, *p* < .001, ηp2 = .38. Compared to never smokers, desire to smoke was higher in smokers and showed a reliable increase during the experiment, *F*(2,62) = 43.50, *p* < .001, ηp2 = .58, which was evident from the first to the second time point, *t*(31) = 5.37, *p* < .001, and from the second to the third time point, *t*(31) = 4.50, *p* < .001. In never smokers, self-reported craving did not change significantly during the study, *F*(2,64) = 2.64, *p* = .112, ηp2 = .08.

The analysis of self-reported pleasure revealed a significant main effect of time, *F*(2,122) = 24.63, *p* < .001, ηp2 = .29. The other effects were not reliable, all *F*s(1,61) < .07, all *p*s > .794, all ηp2s < .01. Compared to the start of the experiment both groups reported a decrease of pleasure at time point two, *t*(63) = 6.62, *p* < .001, followed by an increase at time point three, *t*(62) = 4.76, *p* < .001.

The ANOVA of the arousal data revealed a significant interaction of group x time, *F*(2,122) = 4.00, *p* = .032, ηp2 = .06, but no group, *F*(1,61) = 1.16, *p* = .285, ηp2 = .02, and time effect, *F*(2,122) = 2.79, *p* = .081, ηp2 = .04. Never smokers showed a significant change in arousal during the experiment, *F*(2,64) = 5.12, *p* = .020, ηp2 = .14, evident as an increase from time one to time two, *t*(32) = 2.05, *p* = .048, and time three, *t*(32) = 2.55, *p* = .016. In contrast, self-reported arousal did not change in the group of smokers, *F*(2,58) = 1.74, *p* = .184, ηp2 = .06.

Desire to eat significantly changed during the study, *F*(2,126) = 25.86, *p* < .001, ηp2 = .29. The other effects were not reliable, all *F*s(2,126) < .17, all *p*s > .845, all ηp2s < .01. Both groups showed an increase from the first to the second time point, *t*(64) = 3.45, *p* < .001, and from the second to the third time point, *t*(64) = 5.44, *p* < .001.

The analysis of the desire to drink water revealed a significant effect of time, *F*(2,126) = 3.99, *p* = .026, ηp2 = .06. In both groups the desire to drink water decreased from time one to time two, *t*(64) = 2.44, *p* < .001, probably as participants were allowed to drink during the break. The other effects were not significant, all *F*s(1,63) < 2.29, all *p*s > .135, all ηp2s < .04.

The ANOVA for the desire to drink alcohol returned no significant effects, all *F*s(2,126) < 1.02, all *p*s > .355, all ηp2s < .02.

**Table S2** Mean (SD) scores of the ratings of pleasure, arousal, craving for cigarettes, alcohol, food, or water (scale: 1-9) in never smokers and smokers before the start of the experiment (pre), during the break after the first block of the experiment (mid) and at the end of the experiment (post).

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | | Never smokers  (*n* = 33) | | Smokers  (*n* = 32) | |
| *M* | *SD* | *M* | *SD* |
| Cigarettes |  |  |  |  |  |
|  | pre | 1.09 | 0.20 | 3.09 | 2.01 |
|  | mid | 1.12 | 0.25 | 5.06 | 2.09 |
|  | post | 1.26 | 0.60 | 6.16 | 2.10 |
| Pleasure |  |  |  |  |  |
|  | pre | 2.79 | 1.36 | 2.83 | 1.21 |
|  | mid | 3.88 | 1.85 | 4.00 | 1.78 |
|  | post | 3.00 | 1.60 | 3.10 | 1.40 |
| Arousal |  |  |  |  |  |
|  | pre | 6.97 | 1.90 | 7.33 | 1.35 |
|  | mid | 7.64 | 1.08 | 6.87 | 1.68 |
|  | post | 7.88 | 1.19 | 7.37 | 1.54 |
| Food |  |  |  |  |  |
|  | pre | 2.86 | 1.95 | 3.11 | 2.29 |
|  | mid | 3.71 | 2.47 | 3.73 | 2.70 |
|  | post | 4.53 | 2.47 | 4.56 | 2.72 |
| Water |  |  |  |  |  |
|  | pre | 4.53 | 1.60 | 3.91 | 1.79 |
|  | mid | 4.12 | 1.66 | 3.63 | 2.07 |
|  | post | 3.89 | 1.98 | 3.33 | 1.67 |
| Alcohol |  |  |  |  |  |
|  | pre | 1.27 | 0.47 | 1.34 | 0.75 |
|  | mid | 1.41 | 1.00 | 1.34 | 0.88 |
|  | post | 1.41 | 0.83 | 1.41 | 0.99 |